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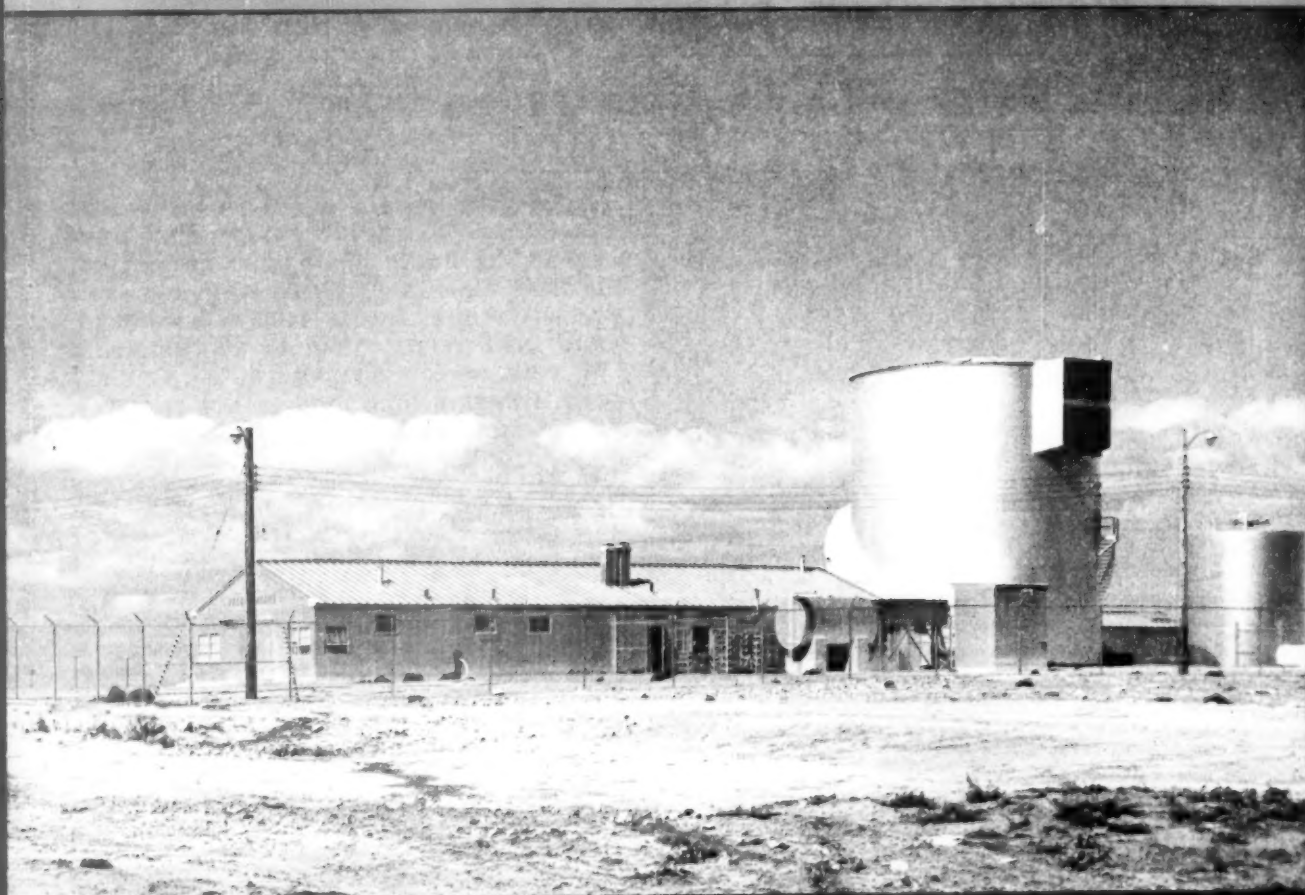
December 6, 1958

VOL. 74 NO. 23 PAGES 353-368

SCIENCE NEWS LETTER

®

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A-Energy Anniversary

See page 363

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MEDICINE

Virus Vaccine Tested

Extensive tests and studies with a live polio vaccine indicate that it may be better than the currently used Salk vaccine as an overall immunizer.

► **TESTS TO DATE** indicate that the live virus polio vaccine is a better overall immunizer than the Salk vaccine, a virology expert has reported.

The exact safety of the live virus vaccine will be definitely established within the next several months.

Then it will be the choice of the physician whether to administer the Salk vaccine or "feed" the live virus vaccine that can be taken by mouth. Dr. Hilary Koprowski, director of the Wistar Institute, Philadelphia, announced at the annual scientific assembly of the Medical Society of the District of Columbia.

The live virus vaccine has proven itself to be a more effective immunizer than the Salk, the virologist said. In addition it can be given to infants under six months of age. The fact that it can be administered by mouth is also a valuable attribute. In highly overpopulated and underdeveloped areas of the world, the syringe type injection entails a long sterilization process that these countries can little afford, the scientist pointed out.

The pill-type vaccine can be administered to large groups of people with relative simplicity.

Some 275,000 children and adults have been immunized with the pill vaccine. Currently, 75,000 additional children are being fed the vaccine as a safety test before final pronouncements on its effectiveness are made. Not one case of infantile paralysis has been reported among those who received the vaccine.

Most of the people who received the pill

are residents of the Belgian Congo. Approximately 150 cases of polio have been reported from this area annually. Unfortunately, the scientists have had no control group available, as everyone in the area was vaccinated. Dr. Koprowski explained that the natives do not understand why some of them should not receive the pills. Therefore, all were given the vaccine.

Currently, effectiveness of the vaccine is being tested by studying the antibody response to the vaccine. No final results have yet been established.

However, 18 families in Moorestown, N. J., participated in an experiment with the live virus vaccine. From this experiment, scientists found that infants fed the vaccine at weekly intervals excreted the live vaccine viruses. These in turn spread within the individual family circles of the Morrestown project mainly through physical contact. This resulted in apparent immunization to these persons also.

Dr. Koprowski explained that New Jersey had been heavily hit by polio this past year. Yet, the county in which the experiment with the pill vaccine took place had no reported cases. The infants in the New Jersey experiment were from two to 18 months of age.

Scientists do not know whether the virus spreads to members of the community outside of the family whose members receive the active virus vaccine. However, the effectiveness of the live virus plus its simple administration procedure make it a desirable immunization tool.

The pill vaccine differs from the Salk vac-

cine in that the Salk contains inactivated polio viruses. Its effectiveness is estimated at between 70% and 90%.

The live virus vaccine is labeled "attenuated" because the strength of the virus is greatly reduced to insure safety.

Recent reports in the *British Medical Journal* state that the live virus vaccine gives a wider range of immunity, is cheaper and can be given by mouth.

Science News Letter, December 6, 1958

ANTHROPOLOGY

Peculiar Writing System Found on Islands

► **A PECULIAR** system of writing used on five atolls of the Central Caroline Islands was described to the American Anthropological Association meeting in Washington by Dr. Saul H. Riesenbergh of the Smithsonian Institution.

Only about 27 people know how to write in this kind of script. There is no resemblance between these characters and those of any other known system of writing.

The system uses a syllabary, not an alphabet, and two sets of characters are used, totaling some 97 symbols. One symbol can stand for several different syllables and a single syllable can be represented by several symbols.

The system of writing seems to be dying out, for there is evidence that 30 to 40 years ago it was known by a larger number of persons and existed on eight atolls.

Science News Letter, December 6, 1958

MICROSCOPY

New Microscope Gives Three-D View of Tissue

► **A NEW KIND** of microscope that gives a three-dimensional view of the specimen under study has been designed and built by two University of Cambridge scientists.

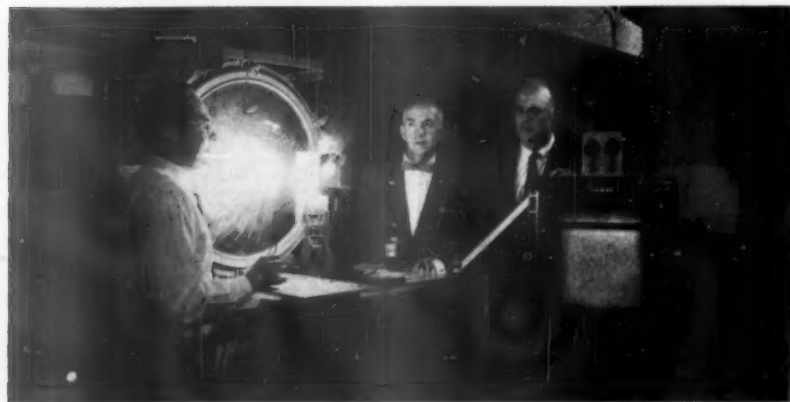
Drs. R. L. Gregory and P. E. K. Donaldson report in *Nature* (Nov. 22) that they are now producing an improved version of their first, primitive model.

The solid-image microscope was designed to have a large depth of field and to present the image as a solid in a luminous block so structures within the specimen can be seen in depth. A test slide of human hair gives a solid image in which the positions of the hairs may be seen in depth. These positions change as the observer changes his viewing position.

The instrument involves two processes. First the slide is mounted on a steel tuning fork that carries it up and down through the focal plane of the objective 50 times each second. Secondly, the image is projected onto a screen that vibrates at the same rate and in the same phase as the slide carrying the specimen. Since the frequency of vibration is greater than the fusion frequency of the observer's eye, little or no flicker is observed.

Drs. Gregory and Donaldson suggest that the tuning forks now used to produce the 50 cycles per second vibration could be replaced by a more precise method for obtaining the scanning motion.

Science News Letter, December 6, 1958



A-BLAST HEAT—A carbon arc furnace at the Naval Material Laboratory, Brooklyn, N. Y., is capable of generating radiant energy equal to the heat of a 20 megaton bomb one mile from ground zero. Willard L. Derksen, Joseph M. McGreevy and Jack J. Press (left to right) watch as a fabric sample is disintegrated.

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AMERICAN EDUCATION PUBLICATIONS, Education Center, Columbus 16, Ohio.—Book: Science Explores our World, report for students of International Geophysical Year programs, 15¢. Gives data on auroras and airglow, cosmic rays, magnetism, meteorology and rockets, etc. Prepared by Hugh Odishaw, exec. dir. of U.S. National Committee for the IGY, and published by the committee and Wesleyan University.

AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, 14125 Prevost St., Detroit, Mich.—Free list: Sixty-two hygienic guides, prepared by a committee of the association, composed of authorities in the fields of medicine, toxicology, engineering and chemistry. Each covers a single chemical, giving the latest available information on maximum allowable concentrations for short and long term exposures, significant chemical and physical properties, major uses, evaluation of exposures, and engineering and medical control procedures. Cost of guides is 25¢ each; 20% discount on 5 or more; 40% discount on 100. Looseleaf binder for guides, \$1.25.

NATIONAL ACADEMY OF SCIENCES, 2101 Constitution Ave., Washington 25, D.C.—Free leaflet: Description of components of new science teaching aid, Planet Earth, \$9.50. Set includes: Six full-color wall posters of earth, oceans, weather and climate, the poles, sun and space, rockets and satellites; 30 students' brochures and a project leader's kit. Purchased separately: student's brochure, 50¢; project leader's kit, 75¢; wall chart set, \$5.75.

OLYMPIC NATURAL HISTORY ASSOCIATION, 600 Park Ave., Port Angeles, Wash.—Olympic National Park: Natural History Handbook by Gunnar Fagerlund; paperbound, illustrated, 67 pp., 35¢. Summarizes outstanding natural history features of Olympic National Park. 101 Wildflowers of Olympic National Park, by Grant Sharpe; paperbound, illustrated, 40 pp., 85¢. A guide to wildflowers of the Park. Geology of Olympic National Park, by W. R. Danner; paperbound, illustrated, 68 pp., \$1.35. A guide to the geology of the Park. The Roosevelt Elk of Olympic National Park, by Coleman Newman; paperbound, illustrated, 24 pp., 90¢. Free leaflets: Wildlife in Areas of The National Park System, 8 pp., request from Olympic National Park, 600 Park Ave., Port Angeles, Wash.

SCIENCE RESEARCH ASSOCIATES, 57 W. Grand Ave., Chicago 10, Ill.—Booklet: Jobs in Science, first of a new series of publications on careers in physical, earth and life sciences, giving data on qualifications and training needed, training opportunities, getting a job, earnings and future outlook. 32 pp., \$1.50 each; 10 or more copies, \$1.13 each. Chart: Jobs in Science, 19"x23" display chart of opportunities in various fields. 50¢ each; 10 or more, 37¢ each. Free: Catalog of booklets, including Life Adjustment and Junior Life Adjustment series, 50¢ each; Modern World of Science series, 60¢ each; Better Living series, 60¢ each. (Lower prices on quantities.)

UTAH GEOLOGICAL AND MINERALOGICAL SURVEY, 200 Mines Bldg., University of Utah, Salt

Lake City, Utah.—Bulletin 51: The Rocks and Scenery of Camp Steiner, Summit and Wasatch Counties, Utah, by Dr. Daniel J. Jones. A prototype for Boy Scout Manuals, prepared in quantity at a nominal cost as a contribution to the better understanding of our outdoor heritage. A glossary, block diagrams, cross sections, and pen sketches supplement the text. Features the filling of peat bogs, the carving of cirques, and the evolution of other mountain topography near the Boy Scout Camp at Steiner, Uinta Mountains, Utah, 25¢. Bulletin 60: The Rocks and Scenery of Camp Hunt, Rich County, Utah, by Dr. Clyde T. Hardy, associate Professor of Geology, Utah State University, Logan, Utah. Dedicated to the Boy Scouts of America. Non-technical, concise, 25¢.

Science News Letter, December 6, 1958

SCIENCE NEWS LETTER

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Edited by WATSON DAVIS

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GENERAL SCIENCE

Expand NATO Science

► A GREATLY EXPANDED science research program in which all member countries of the North Atlantic Treaty Organization would cooperate has been urged by Sen. Henry M. Jackson (D-Wash.)

Sen. Jackson is chairman of the scientific and technical committee of the NATO Parliamentary Conference, which recently met in Paris. In submitting his report on progress during the past year, Sen. Jackson said a solid foundation had been laid but called for strengthening existing programs and initiating new ones.

He said the NATO science fellowship program should be doubled so it would operate on an annual budget of \$8,000,000. If a "Maxwell, a Fermi, an Einstein or a Bohr of the coming generation" is discovered through this program, then the investment will have more than paid off, Sen. Jackson told the Conference.

He also asked for establishment of joint research programs or centers in materials, in upper atmosphere and space, and in oceanography.

Viewed in terms of political geography, Sen. Jackson said, the NATO community is essentially a maritime confederation. Its survival depends upon the free transport of materials and peoples across the Atlantic basin.

The use of nuclear submarines and the threat of submarine-launched missiles has exposed the NATO nations to the threat of devastating attack from the sea. An effective defense system, Sen. Jackson reported, is contingent upon a thorough knowledge of the ocean environment in which submarines operate.

He pointed out that man's knowledge of the oceans making up three-fourths of the earth's surface is "meager and fragmentary," even though man has already taken his first step into space.

Even roughly accurate maps of the deep sea floor exist for only about two percent of the total ocean area, Sen. Jackson said. Very little is known about the properties of the ocean's waters and its bottoms, including the nature of the deep sea currents or the water's acoustic properties.

As the NATO Council launches programs of scientific cooperation, Sen. Jackson noted, the need increases for a basic NATO policy of scientific research and development. The committee therefore called for the formulation of an integrated and long-range policy for scientific research and development in the NATO area.

Science News Letter, December 6, 1958

IMMUNOLOGY

Develop TB Spray Vaccine

► A NEW FORM of tuberculosis vaccine may in the future be sprayed in entire rooms full of people and produce the same amount of immunity as thousands of times the amount of injected vaccine.

The vaccine, known as BCG and used extensively in its injectable form in Europe and Asia, has never been widely used in the U. S.

Three Colorado scientists, who did preliminary testing with guinea pigs, say the airborne vaccine is ready for investigation with human beings.

The scientists, Drs. G. Middlebrook, M. L. Cohn and C. L. Davis, conducted their experiments at the National Jewish Hospital and the University of Colorado School of Medicine, both in Denver. Their work is reported in *Science* (Nov. 21).

Dr. Middlebrook believes it would be possible to vaccinate a great number of persons simultaneously, such as a theater filled with patrons or a classroom of children.

The scientists found the airborne vaccine, when inhaled, is as effective as thousands of times the amount of the same inoculant injected under the skin.

BCG vaccine, named after the bacillus of Calmette and Guérin, was developed in France, and first used there in 1921. Since then, more than 75,000,000 persons throughout the world have been protected via the injection route.

Although the vaccine is considered 80%

effective, its use in the U. S. has been rather perfunctory. There are several reasons for this as reported last year to the U. S. Public Health Service by its Ad Hoc Advisory Committee on BCG:

1. BCG destroys the value of the tuberculin test by converting non-reactors into reactors to tuberculin.
2. Tuberculosis control in the U. S. has reached such a point of sophistication that for the most part BCG is not needed.
3. Wide use of BCG would divert funds and personnel from other tuberculosis control activities.

However, the committee suggested BCG vaccination programs would be useful in such groups as physicians, nurses, medical and nursing students, laboratory workers and hospital employees; persons unavoidably exposed to tuberculosis in their homes; and patients, inmates and employees in institutions, such as mental hospitals and prisons, where exposure is likely to be high.

Science News Letter, December 6, 1958

ENGINEERING

Tiny Tape Recorder Stores 3,000,000 Bits of Data

► A TINY tape recorder able to store 3,000,000 "bits" of scientific information as it travels through space has been developed.

The unit is small enough to be held in

one hand, weighs only eight pounds and measures nine inches long, five inches high and four and a half inches wide. This makes it two-thirds the size of existing recorders with the same capacity.

Developed at Lockheed Missile Systems, Palo Alto, Calif., it can record at unlimited altitudes and in any position or axis for a maximum uninterrupted period of 96 minutes. Unloading the accumulated information takes one-sixth the time it takes to record it. Immediately after the unloading, the recorder is ready to begin storing new information.

The device has survived simulated rocket launchings of 50 times the force of gravity, indicative of its ruggedness. This is comparable to putting it in a jet plane and crashing it into a concrete wall at 1,100 miles per hour.

Driven by synchronous motors, the recorder makes it possible for the first time for a missile or space vehicle to obtain data with an automatic and accurate time reference. The device can record and store data from space during the long interval when space craft are out of direct radio contact with the earth. It then transmits the data on a command signal when the vehicle returns to within the earth's radio range.

In a lunar probe, for example, the midget recorder could store information collected on the far side of the moon while the rocket was out of radio range of the earth.

Fully transistorized, the device requires a low power input of only ten watts to operate its entire electronic system. Furthermore, it is designed so that the power is turned on only when the recorder is in actual operation.

Known as AMR-100 (Airborne Magnetic Recorder), it was developed by Mark Siera, researcher in Lockheed's telecommunications department.

Science News Letter, December 6, 1958



TINY TAPE RECORDER—Mark Siera easily holds lightweight magnetic tape recorder he developed. Complete recorder container is on the table.



LOUIS AGASSIZ: Pied Piper of Science By Aylesa Forsee

Illustrated by Winifred Lubell

Louis Agassiz was born in 1807, son of the Protestant pastor of a small Swiss town. By the time he was fifteen years old his heart and mind were fixed on a career as naturalist and writer, but the family income was too limited to provide the necessary training. The unflagging ardor and firmness of purpose with which he surmounted this difficulty was to bring him to brilliant success not only in fulfilling his original ambition, but in becoming as well physician, geologist, lecturer, museum curator, and—perhaps most important—teacher. \$4.00

SATELLITE OF THE SUN By Athelstan Spilhaus *Illustrated with Photographs*

This introduction to the physics of the earth, by the Dean of the Institute of Technology at the University of Minnesota, deals with "the bulk of the earth, from the rocky substance on the surface right down to the hot liquid metal center," with the water on our planet's surface, and the atmosphere beyond. It includes such subjects as meteors and meteorites; airglow; cosmic rays; the earth's origin, size, and shape; the landscape at the bottom of the ocean; how the two ends of the earth differ; and why the poles are important. \$3.50

AN ADVENTURE IN ASTRONOMY By Kenneth Heuer

Illustrated with Photographs

Written by a former lecturer in astronomy at the American Museum-Hayden Planetarium, this book describes the heavens as they appear from strategic places around the world—New York City; Helsinki, Finland; Longyear City, West Spitsbergen; the North Pole; the South Pole; Wellington, New Zealand; and Quito, Ecuador. Constellations unfamiliar to us—Crux, the Southern Cross, for example, and Musca the Fly—are clearly defined, and excellent photographs supplement the accounts of such wonders as the zodiacal light, the aurora borealis, and the midnight sun. \$3.50

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GENERAL SCIENCE

Destination: 1975

Trips to scientific centers and meetings are arranged and financed by national groups for outstanding students whose scientific potential is recognized through science fairs.

► **THE JOURNEY** of today's student-scientists toward their future involves a good deal of traveling around, which suggests that the most direct route to their destination as full-fledged scientists is via side trips with stop-overs to look around.

In a very real sense these young travelers are exploring new territory. The new land they see is not unexplored wilderness frontier, but an even more exciting domain where revolutionary truths are discovered and working scientists experiment with highly original ideas.

For 17 years high school seniors, judged the 40 annual winners in the Science Talent Search for the Westinghouse Science Scholarships and Awards, have been converging on Washington, D. C., in early spring. They come for the Science Talent Institute's unique experience of talking with eminent scientists, observing science in action in some of the nation's finest laboratories, and discovering the intensely satisfying stimulation of sharing ideas with each other.

Teen-Age Travelers

For nine years hundreds of promising teen-aged scientists have been traveling by plane, train, boat, bus and car to the National Science Fair, held in a different section of the country each May. More than 1,000 have made the trip to date. Of the ones now in college, more than 90% of those reporting their present status are majoring in science, engineering or education. Of those reporting that they are now employed, 92% are working in various scientific specialties. A dozen or more of them have published scientific papers.

Both the Science Talent Search and the National Science Fair are conducted by Science Clubs of America, an activity of SCIENCE SERVICE.

It may very well be 1975 before the American Medical Association and the U. S. Army, Navy and Air Force will know how many Nobelists they have helped to stimulate among 1958's teen-aged scientists. Nevertheless, they are already preparing their 1959 cooperative activities with the National Science Fair to help still another group of students.

The American Medical Association pioneered such professional cooperation with the National Science Fair when it chose two winners and two honorable mentions at the Fair in 1956. Each June the two winners are guests of the AMA at its annual meeting where they are introduced to the nation's doctors and are featured exhibitors among the hundreds of medical specialists who are also presenting the results of their research.

This year Clare L. Chatland, 16, of Missoula, Mont., and David R. Brown, 15, of St. Louis Park, Minn., were the AMA winners. Clare's description of the trip to San Francisco for the annual meeting includes such phrases as: "These people were absolutely wonderful . . . helped me decide for or against those things I had taken for granted . . . offered many chances for scholarships . . . decided to go into medicine, while before I was wavering between medicine and mathematics . . . met truly great and successful men . . . Someday, through work, maybe I will be that way."

David's enthusiasm matched Clare's. He reports: "I saw inside the medical profession and observed just how scientific it can become . . . introduced me to many people who will play an important part in my future . . . brought me self-confidence, which is something I needed very much . . . Exhibits in the scientific assembly and the reprints given out by the exhibitors provide a great source of ideas for future experimentation."

Barbara Ann Conway, 16, of Chattanooga, Tenn., who received the girl's AMA Honorable Mention Citation this year for her research in experimental teratology, had a very special trip. At the invitation of Dr. Hans Selye, world-famed for his work on stress as a basic cause of disease, Barbara worked in Dr. Selye's laboratories at the Institute of Experimental Medicine and Surgery at the University of Montreal. She was permitted to perform surgery herself while at Montreal.

September "Cruisers"

This September, 128 high school boys, designated as Navy Science Cruisers at regional science fairs and the National Science Fair, sailed from east and west coast naval bases for several days of firsthand study of modern science on U. S. Navy vessels. Ichiro Matsubara, finalist at the National Science Fair from the Japanese science fair, was given a ten-day cruise from Tokyo on the U.S.S. *Princeon*, as winner of the Navy's Special Category Award at the national fair.

The American Cruisers returned "filled with fresh knowledge" as Ichiro is reported to have been.

In June two winners and two alternates chosen by the Air Force at the national fair were the guests of Maj. Gen. Stanley T. Wray, Commander of Wright Air Development Center at Wright-Patterson Air Force Base, Ohio. Arrangements also were made for them to visit the Air Research and Development Command's Air Force Arma-

(Continued on page 366)

AERONAUTICS

Nuclear Aircraft Doubtful

► THE MORE engineers investigate the feasibility of nuclear-powered airplanes, the more convinced they become that the problems involved are insurmountable.

This was reported to the American Rocket Society meeting in New York by David L. Clingman, graduate student in aeronautical engineering at Purdue University in Indiana.

Shielding, he said, was one of the most serious problems, since even optimum distribution of shielding material would involve a weight of about 50,000 pounds.

Also, if the aircraft is to be economically sound, it would have to carry a payload of considerable size. This, in turn, would imply a gross weight in excess of a B-52 bomber, or 500,000 pounds.

Runways of sufficient length to enable the craft to get airborne is another problem that has to be overcome, Mr. Clingman said. Making the nuclear airplane a seaplane would alleviate this problem, but introduce another difficulty, that of limited sites for potential bases.

Two choices of reactor configuration to propel such a craft would be the direct air cycle and the liquid-cooled reactor cycle. The former has the disadvantage of requiring the reactor to be mounted between the compressor and the turbine. Since the reactor must be located at the greatest possible distance from the crew compartment, and the propulsion system must consist of multiple units, design of a shieldable reactor capable of accommodating these units is a big problem. The second configuration choice somewhat relieves this shielding problem by the use of water, but offers the penalty of increased weight.

While as great a separation as possible between crew and reactor is desirable, he

declared, it must be remembered that the weight economy achieved in this manner through reduced shielding may be offset by a greater over-all weight and increased drag.

The region of the atmosphere in which nuclear aircraft would have to operate has almost reached the point of aircraft saturation.

Should just one accident involve a nuclear aircraft, he said, the populace would be up in arms instantly, and rightly so.

"It is inconceivable that an airborne reactor could remain intact after a midair collision or severe ground impact," he said. Development of nuclear-powered spacecraft, on the other hand, was imperative, according to Mr. Clingman. Nuclear propulsion lends itself naturally to the current conception of space vehicles, with few of the objectionable qualities inherent in atmospheric aircraft. The very nature of rocket flight precludes the necessity of sustained flight over densely populated areas. Shielding would be simplified in space, too, since radiation scattering would be negligible in the rarefied gases.

Mr. Clingman recommended that reactor developments be concentrated in three specific areas to provide the greatest long-range economic stability for existing natural resources. The first two areas were marine transportation and central power stations. The third was the field of rocket-type vehicles.

Since nuclear power is destined to be the key to space exploration, he said, "it behooves the United States to transfer funds from the nuclear aircraft project, of doubtful value other than as propaganda, to the vital nuclear rocket program."

Science News Letter, December 6, 1958

kins and James L. Gamble of Johns Hopkins University, Dr. Thomas L. Devlin of the Merck Institute for Therapeutic Research, Rahway, N. J., and Dr. Cecil Cooper of Western Reserve University are now attempting to determine the exact structure of the mitochondrion membrane parts and how they function.

The American Cancer Society, the U. S. Public Health Service and the National Science Foundation are supporting the research.

Science News Letter, December 6, 1958

● RADIO

Saturday, Dec. 13, 1958, 1:35-1:50 p.m. EST "Adventures in Science" with Watson Davis, director of Science Service, over the CBS network. Check your local CBS station.

Mr. Jacob Rabinow, president, Rabinow Engineering Company, Takoma Park, Md., will discuss "Mechanizing Letter Sorting."

MEDICINE

Heart Disease Used As Anxiety Defense

► SOME PATIENTS in order to face life need to believe they have heart disease, even when there is proof they do not.

Their conviction may represent a necessary defense against "potentially overwhelming anxiety," three doctors report in the *Journal of the American Medical Association* (Nov. 22).

They studied 52 patients with symptoms of chest pain for a six-year period. Of these, 27 "had no evidence of heart disease but were convinced of its presence," and 25 had angina pectoris, a disease marked by paroxysmal chest pain with a feeling of suffocation and impending death.

The 27 patients who believed they had heart disease were "all intensely anxious people whose neurotic behavior was readily apparent," the doctors say. They tended to dramatize their symptoms and often referred to their "heart pain."

Studies of these 27 patients showed that for some the pain represented a means of setting limits to their activities and freed them temporarily from intense pressures of responsibilities. Their neurotic cardiac condition seemed to act as a means of getting attention and of controlling family members.

In others, the pain represented an acceptable "excuse" for failing to attain certain objectives. For some, there was a definite monetary compensation from their pain.

The study also showed that the average number of doctors consulted by each patient in the cardiac neurosis group was 4.7, compared to only 1.5 for each patient with angina pectoris.

It was not unusual for the neurotic patients to be consulting a number of physicians simultaneously, the doctors found. Drs. William N. Chambers, Mary Hitchcock Hospital, Hanover, N. H.; Joseph L. Grant, Veterans Administration Hospital, White River Junction, Vt., and Kerr L. White, University of North Carolina, made the follow-up study on heart patients.

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CYTOLOGY

Find Cell "Power Plants"

► FRAGMENTS of mitochondria, microscopic "islands" in the cell protoplasm surrounding the nucleus, are helping scientists find out how a cell gets its energy to carry on vital life processes.

All energy comes from combustion of foodstuffs, but exactly how the living cell does absorb, store and release energy is unknown.

Now, Dr. Albert L. Lehninger of the Johns Hopkins School of Medicine has reported, the mitochondrion membrane has been taken apart and analyzed. It has been found to play an essential role in the exchange of electrons needed for energy storage and release.

Of all the parts of the cell, Dr. Lehninger pointed out, only the mitochondrion is known to play a part in combustion. Work by Dr. Lehninger and his colleagues indicates that after dissolving away about 90% of the mitochondrion, membrane fragments

remain that could be described as the "power plants" of the cell.

On a weight basis, this power plant material was from four to six times as active as the whole mitochondrion.

Previous research has shown that cell energy is absorbed and stored with the conversion of ADP (adenosine diphosphate) to ATP (adenosine triphosphate). Energy is released with the reverse process, the breakdown of ATP to ADP. Electron transfer is believed to provide the energy to make ATP from the union of a phosphate group and the ADP molecule.

Enzymes working in identical assemblies in the mitochondrion membrane apparently catalyze electron transport, Dr. Lehninger explained. These appear close together in recurring units throughout the membrane, providing for electron transfer and thus the energy needed for cell life.

Dr. Lehninger and Drs. Charles L. Wad-

ANTHROPOLOGY

Sandals Show Long Occupancy of Cave

► TWO PAIRS of sandals found in the layers of refuse in Frightful Cave, in the state of Coahuila, Mexico, show that this cave was used as a home for more than 6,000 years.

Discovered where they were kicked off the feet of their prehistoric wearers, the sandals were dated by the radiocarbon method at the University of Michigan.

The older sandals were Agave scuffers, loosely and roughly made. They were worn some 8,080 years ago and were found at the bottom of the accumulated deposit on the floor of the cave. The other pair, warp fiber sandals, was found at the top of the deposit and were only about 1,770 years old.

The older pair is not as old as a pair found in Oregon in 1950. That pair was about 9,053 years old.

The Mexican find was collected by Dr. W. W. Taylor Jr. of Mexico City and the radiocarbon dates were found by Drs. H. R. Crane and James B. Griffin of the University of Michigan who reported them in *Science* (Nov. 7).

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ENGINEERING

Predict Practical Uses For Semiconductors Soon

► YOU SOON may be heating your house in the winter, cooling it in summer and getting your electric power from a single device, a semiconductor.

Within ten years, semiconductor research may have developed far enough so that heat-electricity devices for such purposes will be practical, Dr. Wayne W. Scanlon of the U. S. Naval Ordnance Laboratory reported.

Right now, he told the Washington Academy of Sciences, the Russians are using semiconductors to provide electricity in remote parts of the country. He described a small semiconductor generator that fastens around the neck of a kerosene lamp and converts the heat produced to an electric current sufficient to power a small radio.

In the United States, however, there has not been as great a demand for this method of generating electricity and our thermoelectricity research has, until recently, lagged behind that of the Russians. This is especially true in respect to applications and development. Transistor radios are perhaps our most extensive use of semiconductors.

There are several applications of semiconductors that would be useful in this country at the present, however, Dr. Scanlon said.

For example, it is possible to design a device suitable to use for freezing specimens for study in the laboratory. No water or other liquid is needed, he pointed out, only a relatively small quantity of electricity

and a suitable arrangement of semiconductor metals.

Although the efficiency of semiconductors has increased greatly in the past ten years, from approximately three percent to 15%, they still have some way to go before reaching or exceeding the 40% efficiency of the largest and best power generators now in use. There is no theoretical reason, Dr. Scanlon said, why semiconductors can not reach this rate of converting almost half the heat produced to electricity.

Until improvements are made, semiconductors will find their greatest use here in the laboratory or in solar batteries in space ships and satellites.

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PUBLIC HEALTH

Measure Cigarette Butts In Cancer Search

► SCIENTISTS of the British Medical Research Council are to collect thousands of cigarette ends off the streets, in restaurants and offices. They are attempting to find out the average length of the butt the British smoker throws away.

If substantially less than one inch is found, it will be taken as further support for the theory that excessive smoking causes lung cancer. If the answer is more than one inch, the whole theory may be thrown into serious doubt.

The question of the vital statistics of the wasted part of the British cigarette is raised as a matter of medical urgency by Dr. Cuyler Hammond, the statistics chief of the American Cancer Society. He raised it to try to explain why lung cancer in men is twice as common in Britain as in the U. S.

Dr. Hammond pointed out that Americans smoke more cigarettes than Britons, and they inhale to about the same extent. If smoking really is to blame, only one possible solution remains: the British consume more of the tobacco in each cigarette because they throw away a smaller butt.

After measuring thousands of butts discarded in New York, Chicago, Pittsburgh and Los Angeles, Dr. Hammond reported that the average American throws away about one and a quarter inches of every cigarette. This means that approximately 40% of each cigarette is wasted.

The length of the British butt is still unknown but research among the gutters of Holland has shown that the thrifty Dutch discard a butt only three-quarters of an inch long on an average. And lung cancer is particularly rife in the Netherlands!

The importance of the length of the butt lies in the fact that the smoke from the last part of a cigarette is far richer in tar than the first part.

Dr. Hammond admitted that the length of a butt can be deceptive because it may smolder after being thrown away and that filter tips complicate the issue.

If the mystery is not solved by the Medical Research Council's inquiry, doctors will have to look for other causes of lung cancer besides smoking, Dr. Hammond said.

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IN SCIENCE

ASTRONOMY

Improved Method Fixes Hot Star Distances

► COMBINING telescopic discoveries and new mathematical computations, an improved method of measuring the distances and brightness of certain hot stars has been put into practice by Dr. George O. Abell, assistant professor of astronomy at the University of California at Los Angeles.

As a first step, Dr. Abell helped discover 86 new so-called planetary nebulae. Superficially resembling planets, planetary nebulae actually consist of gradually expanding shells of gases, ejected by hot stars.

The masses of the nebulae are tremendous, averaging some 60,000 times more material than the earth, and reaching 1,000 times the size of our entire solar system.

Such an impressive telescopic target, plus the special nature of a nebula's gases, enabled Dr. Abell to calculate, by a new mathematical formula, the light emitted by the planetary nebula. From the calculated light emission and the nebula's apparent faintness, he derived the nebula's distance by standard astronomical methods.

Since the star is usually at the center of its enveloping nebula, the final step was to fix the distance and brightness of the hot star itself.

Some of these stars, Dr. Abell believes, seem to belong to a class known as white dwarfs, stars believed to be gradually cooling off prior to dying. Dr. Abell discovered the 86 new planetary nebulae while taking part in the National Geographic Society-Palomar Observatory Sky Survey.

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ENGINEERING

System Enhances Images on Radarscope

► AN ELECTRONIC system that enlarges the blips or electronic pictures on radarscopes, and makes possible the use of small, relatively inexpensive target missiles to simulate enemy bombers has been announced by the Sperry Gyroscope Company, Great Neck, N. Y.

Known as SEE (Sperry Echo Enhancer), it consists of a Sperry traveling wave tube, a miniaturized power plant and an antenna, and weighs less than 20 pounds.

The system is made to be mounted within an aircraft or target drone, detect pulses from ground radars and send back signals of greater intensity to create blips of any desired size on the ground radarscopes. The target drones are then intercepted and destroyed by fighter planes or guided missiles.

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ICE FIELDS

ICHTHYOLOGY

Fisheries Research Pays In Successful Tuna Catch

► FISHermen looking for the albacore tuna threw away their crystal balls when it came to predicting where this year's heaviest catch would be. Experts at the California Department of Fish and Game knew where the elusive tuna would run.

Studies of sea water temperatures and currents, together with the cooperation of fishermen, made the predictions possible. Detailed information fishermen gave on previous catches helped solve the problem of locating the most productive fishing areas.

Department scientists predicted that albacore school groups would sweep coastward considerably farther north than in any previous year, bypassing a 100,000-square-mile area that has been highly productive for the last ten years. They pinpointed the area in which the tuna would appear and fishermen were ready outside the San Juan Seamount to harvest the first run of the 1958 season.

It is estimated that hundreds of thousands of dollars were saved, since commercial fishermen could remain in port until notified where the tuna would be.

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ENGINEERING

Infrared Device Helps Army Avoid Crevasses

► A SNOW-COVERED crevasse can mean injury or frozen death.

The Army Corps of Engineers now has developed an infrared device to help polar researchers overcome this ever-present threat of polar treachery.

Carried by aircraft over the white Arctic and Antarctic regions, the device sees and records on film the underlying ice cracks which are invisible to the human eye.

Dr. Henri Bader and Leonard Stanley, of the Corps of Engineers Snow, Ice and Permafrost Research Establishment (SIPRE), Wilmette, Ill., told SCIENCE SERVICE that the device is "a black box" containing optical, electronic and camera equipment. The incoming radiations are focused through optical lenses, amplified by the electronic system and fed into a scanning device similar to those used in television receivers. Images are recorded on the camera film and, like a TV screen, appear as a series of fine lines. Colder areas show up dark on the film and warmer areas light.

Large sections of the ice caps can be covered from the air and safe passages can be mapped out quickly for polar travelers.

Although one might hardly dream of

heat coming from snow and ice fields, it is just such warm emanations, weak as they are, that make the detection system workable. The heat, or infrared radiation, is given off by everything above the lowest possible temperature (about 459 degrees below zero Fahrenheit).

The theory was first proposed by B. Lyle Hansen, a SIPRE scientist, based on observations that the snow bridges over crevasses tend to breathe. Depending on outside barometric pressure and temperature, they inhale or exhale. The temperature just above the bridge is either warmer or colder than that of the surroundings.

An earlier electronic device developed by the Army Engineers is pushed ahead of a motorized snow vehicle and detects crevasses in time to prevent accidents. Its limitation, which is overcome by the airborne infrared system, is that it cannot easily map out the length, breadth and shape of the ice cracks.

Other SIPRE scientists involved in the developmental work are Dr. Jack N. Rinker and Robert Leighy.

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MEDICINE

Resistant Strep May Force Individual Care

► HOSPITAL nurseries may have to be replaced by private rooming-in units for the mother and infant in order to exclude drug-resistant bacteria from adjacent hospital areas.

A study of nursery contamination by antibiotic-resistant staphylococcus bacteria has indicated that newborn infants acquire the bacteria primarily from older infants, and not from hospital personnel. This finding was made by Dr. Valerie Hurst, of the University of California Medical Center in San Francisco, and reported to the International Colloquium on Resistant Infections meeting in New York.

A newly opened nursery at the University Hospital, said Dr. Hurst, became contaminated with drug-resistant staphylococci as soon as infants and nursing personnel were transferred to it from another nursery.

It was found that the phage patterns and antibiotic sensitivity of the bacteria within the new nursery were identical to those of the bacteria infecting the infants who were brought in. The patterns and sensitivity were different in the bacteria carried in the respiratory tracts of the hospital staff.

It was also found that the nursery contained about three times as many staphylococci as other hospital areas occupied by the nursery personnel but not the infants. The conclusion was that newborn infants scheduled to be placed in the nursery would be much more apt to be contaminated with antibiotic-resistant bacteria by the older infants moved in than by regular hospital personnel.

Rooming-in was said to be conducive to less contamination within the hospital and a lesser probability of carrying bacteria from the hospital to the home.

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BIOCHEMISTRY

Study Cholinesterase In Receptor Sense Organs

► THE DISCOVERY that the chemical cholinesterase is found in "rather large amounts" in the biggest sense organs of the skin is helping to explain how nerve conduction takes place.

More than 1,000 of these sense organs, known as Pacinian corpuscles, were analyzed, Drs. Werner R. Loewenstein and D. Molins of the department of physiology, Columbia University's College of Physicians and Surgeons, report. An average concentration of cholinesterase was found capable of splitting 16 milligrams of acetylcholine in one hour for each gram of corpuscle tissue.

This cholinesterase-acetylcholine reaction is believed necessary for excitation of a sense organ, converting an external pressure on the organ receptor to electrical conduction of the "feeling."

While the enzyme discovered in the Pacinian corpuscles is a form of cholinesterase, the scientists report in *Science* (Nov. 21), it is not the typical kind of acetylcholinesterase found in many excitable tissues.

The most interesting observation, Drs. Loewenstein and Molins say, was the uneven distribution of cholinesterase inside the corpuscle. Most of the enzyme appears to be localized in the nerve axon and ending, and in the thin hull of the core that surrounds the ending. The remaining tissue contains only a little enzyme.

Tests showed the amount of cholinesterase in this core section had an acetylcholine-splitting activity as great as that of cholinesterase found at nerve-muscle junctions.

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IMMUNOLOGY

Honey Bee, Snake Venom Protects Against Bacteria

► IF A staphylococcus gets you, one remedy might be to let a honey bee sting you.

Crude venom from the honey bee, the Australian black snake, the king brown snake, as well as part of the venom of the Australian tiger snake will protect mice against the deadly action of staphylococcus toxin, two scientists reported in *Nature* (Nov. 15).

All the venoms are strongly hemolytic which means they dissolve the red blood cells, releasing hemoglobin. Only the fraction of the tiger snake's venom that is rich in hemolysin protects mice against the bacterial toxin, E. A. North and Hazel M. Doery of the Commonwealth Serum Laboratories, Victoria, Australia, said.

Since the venoms also contain the enzyme phosphatidase-A which acts to produce a long-chain fatty acid, this may be the explanation for venom's protective nature. Previous research has shown some fatty acids neutralize test tube preparations of bacterial toxins.

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PSYCHIATRY

Therapy for Crime

Aim of new penology is to get the prisoner ready to go out and stay out by returning him to society as a useful, law-abiding, self-supporting citizen.

By MARJORIE VAN DE WATER

► **BLAME AND PUNISHMENT** are going out of fashion in America's prisons. Just as insane asylums have become mental hospitals, the "new penology" being developed promises to make our prisons truly correctional institutions.

Someday diagnosis and therapy promise to replace blame and punishment in the management of law violators. The "know-how" is being developed in scientific studies.

The glaring facts are that much more than half of those who serve time return to prison.

Dr. James V. Bennett, director of the Federal Bureau of Prisons, finds that "at least 55% to 60% of the prisoners leaving prison today will return within five years." J. Edgar Hoover, director of the Federal Bureau of Investigation, points out that 70% of the fingerprints of arrested persons received by the FBI are of persons who have records of previous arrests.

New Goals Set

What is the goal of the new penology?

It is explained by Dr. Alfred C. Schnur, formerly associate warden of Minnesota State Prison and now teaching in the School of Police Administration and Public Safety, Michigan State University.

The aim is to get the men ready to go out and stay out by returning them to society as useful, law-abiding, self-supporting and independent citizens who will not only obey the law themselves but refrain from contributing to crime by others.

The new penology has an average of about 22 months to accomplish this task. Half the law violators who enter prison will be back on the street before this time has passed. Unfortunately, the time a man spends in prison is largely wasted.

There are 26,938 persons employed full time in state and Federal prisons and reformatories to concern themselves with 161,587 inmates. That amounts to one prison employee to every six inmates. But the great majority, 17,280, of these employees are concerned with just keeping the prisoners in prison. Others are hired to keep the men busy, keep them fed and keep them reasonably well. Only a few, 1,337, are there to prepare them to go out.

Many of the 161,587 need the help of a psychiatrist. Few people would claim that all the persons who commit crimes are psychotic. More than 100,000, according to Dr. Bennett, are twisted, queer, handicapped, defeated, embittered or seriously neurotic.

Confinement alone can only make their plight worse. Punitive measures can only make them more warped and incapable of taking a responsible part in the community as a useful citizen when they are permitted to leave prison.

"The true story of prisons lies not in charts and statistics," Dr. Bennett has said, "but in the tragedy and heartbreak they represent; to the prisoner, the wasted years that can never be recaptured; and to society, the loss of precious human resources and talent."

"Each year, the courts send thousands of people to prison. They come from all walks of life and are of all types."

"Some are professional, calculating criminals against whom must be marshalled the full force of society's organized authority; many are hostile, impulsive, and psychopathic who must be confined for the safety of others; but mostly, those who enter prison are confused, frustrated, resentful people caught in the blind alley of some deed or unfortunate circumstance. These

need re-direction, training, understanding and guidance."

But how many psychiatrists are employed to treat the 161,587 prisoners? Dr. Schnur gives us the answer. There are exactly 23 full-time psychiatrists. That amounts to one psychiatrist for each 7,026 inmates.

If each psychiatrist put in an eight-hour day and a 160-hour month with no time off for illness or emergencies, coffee breaks or staff conferences, it would mean that there is not more than one minute and 22 seconds of psychiatric help available for each inmate during a whole month.

That is not enough.

And even that fragment of time is not focused on life after prison. Instead, it is focused on keeping things reasonably orderly for the prison administration and on readying some men for transfer to a mental institution.

Defective Criminals

Many of the prisoners got into prison because they are lacking in intelligence. Their judgment is faulty; they could not get along in school or learn a trade. The prisons have 67 psychologists and psychometrists. If they distributed their time evenly, each prisoner would have about four minutes of their time monthly for individual attention.

The 96 institutional parole officers could give about six minutes to each man each month.

Not even the chaplain has time for heart-to-heart talks with the prisoners. The whole group of 155 chaplains could give less than ten minutes a month to each man.

Many prisoners got into trouble the first time merely because they never were trained to get and hold a good job that would support them and their families.

The prisons have 739 academic, vocational and trade teachers, but altogether they would have not over 45 minutes available for each prisoner in a month.

The average prisoner spends some 15,840 hours within those grim walls before he is back on the streets again. But in that time a total of only 30 hours will have been devoted to making him fit and safe to return to society.

Despite the experts, despite modern knowledge of penology, such rehabilitation as may take place during the prison term must be largely the result of the prisoner's own do-it-yourself project.

"It should come as no surprise," comments Dr. Schnur, "that so many men return to crime following such 'lavish' treatment programs. It is, indeed, remarkable that there are not more recidivists."

"The new penology has not yet really been drafted into the war against crime," he said.

What treatment personnel is available is not evenly distributed among the institu-



FREE—FOR HOW LONG?—Lighting a cigarette with his first breath of free air, this man leaves the grim prison walls behind. But is he ready to take a responsible place in society or was his time behind bars largely wasted? The man shown is a photographer's model, not a prisoner.

tions. Institutions where they are concentrated serve as beacon lights to those who feel the new penology should be tried. They shine as an indication that someday diagnosis and therapy will supplant blame and punishment in the management of law violators.

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MEDICINE

Study Faculty Needs For Rheumatic Diseases

► THE AMERICAN Rheumatism Association has established a committee for the exchange of information concerning faculty appointees and fellows. There is a need for information about available personnel to staff the numerous new units that are being established in medical schools in this country and abroad for the study of rheumatic diseases.

The committee will be pleased to receive information about fellowships and traineeship opportunities and faculty and other staff vacancies as well as inquiries regarding available personnel. Address Dr. Currier McEwen, New York University College of Medicine, 550 First Avenue, New York 16, N.Y.

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ENGINEERING

Dedicate New Reactor on A-Energy Anniversary

See Front Cover

► THE ARGONNE Low Power Reactor (ALPR), was dedicated on Tuesday, Dec. 2 at the Argonne National Laboratory's Idaho site at the U.S. Atomic Energy Commission's National Reactor Testing Station near Idaho Falls.

The date is the sixteenth anniversary of the birth of atomic energy.

The photograph on the cover of this week's SCIENCE NEWS LETTER is a view of the reactor and support facilities building looking northeast from an access road.

The ALPR is a direct-cycle boiling water reactor of 3,000-kilowatt gross reactor heat, moderated and cooled by the natural circulation of ordinary water. Designed to produce 200 kilowatts of electricity and 400 kilowatts of space heat, it can be transported by air, uses gravel at the site for biological shielding and can operate for three years on a single fuel loading.

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Questions

ASTRONOMY—How large are the masses of some planetary nebulae? p. 360.

CYTOLOGY—Which part of the mitochondrion appears to be the cell "power plant"? p. 359.

MEDICINE—What would be the advantages in administering a live polio virus vaccine? p. 355.

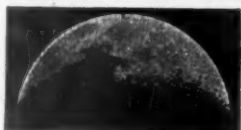
Photographs: Cover, Argonne National Laboratory; p. 355, U.S. Navy; p. 357, Lockheed Missiles Systems; p. 362, Fremont Davis; p. 368, Bell and Howell.

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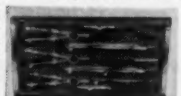
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AN ADVENTURE IN ASTRONOMY—Kenneth Heuer—*Viking*, 127 p., illus., \$3.50. As in a planetarium demonstration, the book describes unusual celestial phenomena and shows how, as one changes his latitude, the heavens, as well as the earth, are transformed.

AIRWAYS OF AMERICA—Poyntz Tyler, Ed.—*Wilson, H. W.*, 189 p., \$2. Collection of articles on commercial air travel.

AUDIO MEASUREMENTS—Norman H. Crowhurst—*Gernsback*, 223 p., illus., paper, \$2.90. Reference work and textbook.

BASIC PULSES—Irving Gottlieb—*Rider*, 175 p., illus., paper, \$3.50. Explains what pulses are, their composition, measurement, generation and application.

THE BUILDING OF TVA: An illustrated History—John H. Kyle—*La. State Univ. Press*, 162 p., illus., \$7.50. Survey of TVA achievements in its 25th anniversary year.

CAREER 1958: For the Experienced Engineer and Scientist—William H. Otley, Ed.—*Careers Inc.*, 72 p., illus., quarterly, single copies \$1.95. Replaces *CAREERS FOR THE CHEMICAL ENGINEER*, listed SNL Nov. 8, 1958.

ESSENTIALS OF THERAPEUTIC NUTRITION—Solomon Garb—*Springer Pub. Co.*, 147 p., paper, \$2. Course for graduate nurses emphasizing the "why" of the nutritional regime.

A FIELD GUIDE TO TREES AND SHRUBS—George A. Petrides—*Houghton*, 431 p., illus. by author and Roger T. Peterson, \$3.95. Field

marks of trees, shrubs and woody vines that grow wild in northern U.S. and southern Canada.

THE FOSSIL BOOK: A Record of Prehistoric Life—Carroll Lane Fenton and Mildred Adams Fenton—*Doubleday*, 482 p., photographs and drawings, \$12.50. Tells what fossils are, where they are found, what they mean, and how they are related to plants, animals and lesser creatures living on the earth today. A guide for collectors with bibliographies and glossary.

GEOLOGY OF THE GREAT LAKES—Jack L. Hough—*Univ. of Ill. Press*, 313 p., illus., \$8.50. Discusses the geological history of Lakes Superior, Michigan, Huron, Erie and Ontario. Bibliography included.

A GUIDE TO THE HISTORY OF BACTERIOLOGY—Thomas H. Grainger, Jr.—*Ronald*, 210 p., \$4.50. Selected annotated list of references.

THE HEALTH OF A NATION: Harvey W. Wiley and the Fight for Pure Food—Oscar E. Anderson, Jr.—*Univ. of Chicago Press* for Univ. of Cincinnati, 333 p., \$6. Biography of the chief chemist of the U.S. Department of Agriculture, who led the fight for the Pure Food and Drug Act of 1906.

INTERNATIONAL COMMITTEE OF ELECTROCHEMICAL THERMODYNAMICS AND KINETICS: Proceedings of Eighth Meeting, Madrid 1956—*Butterworth (Canada)*, 497 p., illus., \$19. Papers and discussions, in English and French.

INTRODUCTION TO BESSEL FUNCTIONS—Frank Bowman—*Dover*, 135 p., paper, \$1.35. Reprint of first edition.

JUNCTION TRANSISTOR ELECTRONICS—Richard B. Hurley—*Wiley*, 473 p., \$12.50. Coordinated, basic knowledge of the characteristics and circuit applications of transistors.

MEN, MOLDS AND HISTORY—Felix Marti-Ibanez—*MD Publications*, 114 p., \$3. Introduction to the world of antibiotics, their culture, techniques and impact on medicine.

THE METAL THORIUM: Proceedings on 1956 Conference on Thorium—Harley A. Wilhelm, Ed.—*Am. Soc. of Metals*, 397 p., illus., \$10. Conference was held in cooperation with the Atomic Energy Commission.

MICROSOMAL PARTICLES AND PROTEIN SYNTHESIS—Richard B. Roberts, Ed.—*Pergamon* for Wash. Acad. of Sciences, 168 p., illus., \$5. First symposium of Biophysical Society held at M.I.T. in February 1958.

NOMENCLATURE OF PLANTS: A Text for the Application by the Case Method of the International Code of Botanical Nomenclature—Harold St. John—*Ronald*, 157 p., paper, \$2.50.

NUCLEAR REACTORS FOR POWER GENERATION—E. Openshaw Taylor, Ed.—*Philosophical Lib.*, 144 p., illus., \$7.50. Of interest to engineers associated with the building and operation of nuclear power stations.

THE OIL CENTURY: From the Drake Well to the Conservation Era—J. Stanley Clark—*Univ. of Okla. Press*, 280 p., illus., \$3.95. Traces the development of techniques from early waste to controlled production.

OPTICAL PROPERTIES OF SATURN'S RINGS: I. Transmission—Allan F. Cook II and Fred A. Franklin—*Smithsonian Inst. (Govt. Printing Office)*, Smithsonian Contributions to Astrophysics, Vol. 2, No. 13, 7 p., paper, 20¢.

PERKIN CENTENARY LONDON: 100 Years of Synthetic Dyes—John Read and others, foreword by Sir Robert Robinson—*Pergamon*, 136 p., illus., \$7.50. Review of progress since Perkins' achievement which led to the virtual supersession of natural dyes by synthetic ones.

PERSONALITY PATTERNS OF PSYCHIATRISTS, Vol. I: A Study of Methods for Selecting Residents—Robert R. Holt and Lester Luborsky—*Basic Bks.*, 386 p., \$7.50. Based on ten-year research study of 466 applicants for psychiatric training at The Menninger Foundation.

PERSONALITY PATTERNS OF PSYCHIATRISTS, Vol. II: Supplementary and Supporting Data—Robert R. Holt and Lester Luborsky—*Basic Bks.*, 400 p., paper, \$4.

THE PHYSICS OF ELEMENTARY PARTICLES—J. D. Jackson—*Princeton Univ. Press*, 135 p., \$4.50. For graduate students and for physicists not specializing in this field.

THE PHYSICS OF RUBBER ELASTICITY—L. R. G. Treloar—*Oxford Univ. Press*, 2nd ed., 242 p., \$5.60. Revision includes special chapters on swelling phenomena and on the estimation of the degree of cross-linking.

PSYCHIATRY IN THE BRITISH ARMY IN THE SECOND WORLD WAR—Robert H. Ahrenfeldt, foreword by Eli Ginzberg—*Columbia Univ. Press*, 312 p., \$6. Discusses personnel and officer selection, mental defects and treatment of psychiatric cases, forward psychiatry and morale.

THE PSYCHODYNAMICS OF FAMILY LIFE: Diagnosis and Treatment of Family Relationships—Nathan W. Ackerman—*Basic Bks.*, 379 p., \$6.75. Outlines conceptual approach to emo-

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THE QUALITY OF MURDER—John Holland Cassity, introd. by James D. C. Murray—*Julian Press*, 268 p., \$4.50. A psychiatric and legal evaluation of motives and responsibilities involved in the plea of insanity.

THE REINTEGRATIVE PROCESS IN A PSYCHOANALYTIC TREATMENT: Vol. III of *The Integration of Behavior*—Thomas M. French—*Univ. of Chicago Press*, 484 p., \$10. Seeks to improve our understanding of how the treatment exerts its influence on the patient.

ROADS—Fon W. Boardman, Jr.—*Walck, Henry Z.*, 143 p., illus., \$3.50. The story of road building from ancient Egypt to the Pan American Highway.

RUSSIAN-ENGLISH MEDICAL DICTIONARY—Stanley Jablonski, Ben S. Levine, Ed.—*Academic*, 423 p., \$11. Based on Russian terms extracted from medical publications in the Soviet Union from 1946 to 1957.

SECRETS OF HYPNOTISM—S. J. van Pelt, foreword by Melvin Powers—*Wilshire Bk.*, 212 p., illus., paper, \$2. On the importance of hypnosis in medicine.

SELECTED PAPERS ON QUANTUM ELECTRODYNAMICS—Julian Schwinger, Ed.—*Dover*, new ed., 424 p., paper, \$2.45. Includes papers by Bethe, Dirac, Fermi, Heisenberg, Oppenheimer, Wigner, and others.

SOLID STATE PHYSICS, Vol. 7: Advances in Research and Applications—Frederick Seitz and David Turnbull, Eds.—*Academic*, 525 p., \$12. On structures and elastic constants of crystals, on electron energy bands in solids and other subjects.

STATICS AND THE DYNAMICS OF A PARTICLE—William Duncan MacMillan—*Dover*, 430 p., \$2. Reprint of 1927 textbook in theoretical mechanics.

TEACHERS PACKET ON SOUTH ASIA: Ceylon, India, Nepal and Pakistan—*The Asia Society*, \$1. Experimental folder with pamphlets, maps and audio-visual material, to encourage the study of Asia in American schools.

THEORETICAL MECHANICS: An Introduction to Mathematical Physics—Joseph Sweetman Ames and Francis D. Murnaghan—*Dover*, new ed., 462 p., paper, \$2. Unabridged reprint of 1929 edition.

TOPICS IN ELECTROMAGNETIC THEORY—Dean A. Watkins—*Wiley*, 118 p., illus., \$6.50. One-semester graduate course in micro-wave engineering.

VECTOR ANALYSIS WITH AN INTRODUCTION TO TENSOR ANALYSIS—A. P. Wills—*Dover*, 285 p., paper, \$1.75. Unabridged corrected republication of 1931 edition.

WALT DISNEY'S WHITE WILDERNESS: Animals of the Arctic—Robert Louvain and others—*Simon & Schuster*, 56 p., illus., 50¢. For young readers.

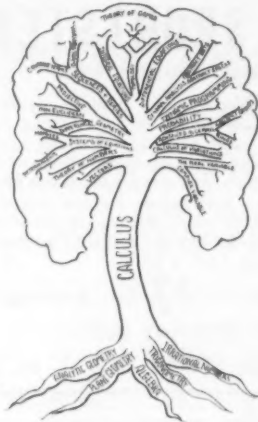
WHAT'S IN THE AIR?—Hazel Holly—*Public Affairs Committee*, Pamphlet No. 275, 20 p., illus., paper, 25¢. Issued on the occasion of the National Conference on Air Pollution of the Public Health Service in November 1958.

WILD PARADISE: The Story of the Coto Donana Expeditions—Guy Mountfort—*Houghton*, 239 p., photographs by Eric Hosking, \$7. Ornithologist's story of birds observed in the wildlife sanctuary on the southeast coast of Spain.

THE WILDEST GAME—Peter Ryhiner as told to Daniel P. Mannix—*Lippincott*, 320 p., illus., \$4.95. On the business of wild animal trapping.

THE WORLD OF NITROGEN—Isaac Asimov—*Abelard-Schuman*, 160 p., \$2.75. Explains the range of nitrogen-containing organics, from explosives to vitamins and from dyes to antibiotics, for the general reader.

Science News Letter, December 6, 1958



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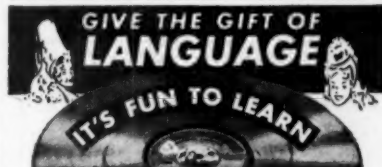
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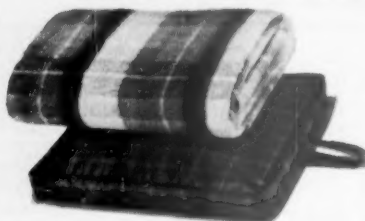
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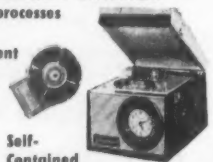
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Destination: 1975

(Continued from page 358)

ment Center at Elgin Air Force Base, Florida, to see a demonstration of new weapon systems. This fall, one of the alternates, William E. Kirchmeier, Jr., of Bismarck, N.D., represented the other three honorees at the annual meeting of the Air Force Association.

The Army took its three winners and three alternates on Army science trips to installations particularly relevant to their individual interests. The boys who visited the Army Ballistic Missile Agency at Huntsville, Ala., were impressed by their discussions with Dr. Wernher Von Braun and their reports included: "I have a standing invitation to work here summers and then full time . . . received ideas on how to design and test a large scale scientific project . . . strengthened my ideas about : scientific career."

Inspiration for Medical Research

The trip to the Army Medical Center in Washington, D.C., inspired: "I hope to be able to work here at Walter Reed where so many experts in every medical field 'walk with kings and keep the common touch' . . . reinforced my decision to enter medical or zoological research . . . learned many new concepts and new methods . . . a dream come true in its opportunities to evaluate medical research as a career." (One of these boys was accepted for early admission to Yale University.)

The Jet Propulsion Laboratories at Pasadena, Calif., were described in terms of: "Really great . . . such things as an actual static test of a rocket, the instrumentation used in rockets, and the wind tunnels impressed me the most . . . not only knowledge about the operation of a certain rocket but, perhaps more important, the knowledge that men engaged in work that I someday hope to do, have faith and hope in me and the work that I have done and hope to do in the future."

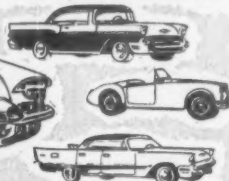
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Science News Letter, December 6, 1958

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THE PANTHER — ferocious and cunning — obtains its prey by springing from ambush. (Lark photo from Western Ways)

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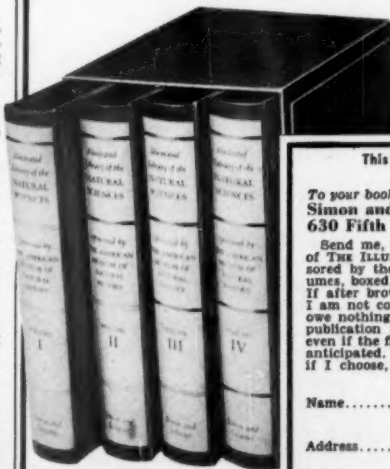
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Science News Letter, December 6, 1958

✿ **TWO-PLY BLANKET** for outdoor sportsmen is made of two different synthetic fibers and can be folded to book size for easy storage. The combined properties of both materials make the blanket warm, washable, water-repellent and resistant to mildew and fire.

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✿ **AUTOMATIC STILL CAMERA** has an electric eye that computes the light reading and sets the lens opening. The lens requires no focusing. An indicator in the



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ness. It is hermetically sealed and shock resistant.

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✿ **ICE SKATING RINKLINERS** of plastic come in sizes from 40 by 40 feet to 100 by 200 feet, for home, playground or community use. They are made of one-piece, heat-sealed polyethylene, four one-thousandths of an inch thick. Cold-proof and non-brittle, they hold their water during warm spells.

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Science News Letter, December 6, 1958



Nature Ramblings



By HORACE LOFTIN

► FOR MILLIONS of years the giant reptiles ruled the earth. These gargantuan figures were the dominant animal life of the world, and lesser beasts lived in their shadows. Then something happened—slowly or suddenly, we will never know—which led to the absolute extinction of these creatures from the face of the earth they once ruled.

What was that "something" that meant disaster for the dinosaurs? We do not have a specific answer, or answers, but we can be pretty certain that their end was connected with a change in their habitat and their inability to cope with the change.

Perhaps the earth's prevailing climate grew too cold or too warm for their way of life.

Their very success might have caused their fall, as too great a number of them overtaxed the resources of the ancient land. As the competition among the reptiles in-

Dinosaurs and Men



creased, other creatures (for example, the humble ancestors of the present-day mammals) probably were able to displace the giants from their own realm.

Some one million or so years ago, a new type of mammal appeared. He had an ape-like appearance, but in most features he was highly unspecialized. He had thumbs that opposed his fingers, peculiarly structured feet, hind limbs and pelvic bones that allowed him to walk more or less upright, and a skull-case (and brain) of large proportions. But aside from these

features, this new mammal was seemingly not much of a specimen for the battle for survival. No great muscles, no giant size, no wings for flying, no teeth or claws for defense, no special fleetness of foot.

Yet this creature has risen to become the one animal that has, as a species, most completely dominated the earth. The dinosaurs' rule was much less extensive. Man has spread from above the Arctic Circle to the equator to the Antarctic. He can live on deserts, in mountains and jungles, on the sea.

The secret of man's success has been his lack of physical specialization, coupled with his highly specialized brain. He does not need fangs, for he can create weapons from stone and atomic fission. He does not need fur, for he takes it from animals and can make it from synthetic fibers. Because of his brain, he has been able to "alter" his environment to his taste.

He truly rules the earth.

Science News Letter, December 6, 1958

